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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/598,662	11/09/2006	Ki-Baek Han	3103-282	8632

24112 7590 07/30/2007

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EXAMINER	
ANDERSON, DENISE R	
ART UNIT	**PAPER NUMBER**
1709	

MAIL DATE	DELIVERY MODE
07/30/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/598,662	HAN ET AL.	
	Examiner	Art Unit	
	Denise R. Anderson	1709	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *13-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *13-24* is/are rejected.

7)☒ Claim(s) *14-24* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 September 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Objections

1. Claims 14-24 are objected to because of the following informalities: Claims 1-12 were cancelled and replaced with claims 13-24 -- but claims 14-24 still depended on the original claims 1-12. In the patentability analysis that follows, the examiner assumed the new claims had the same claim dependency structure as the old claims. Appropriate correction is required.

2. Claims 18-24 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Each claim appears below in italics with the examiner's comments in normal font.

Claim 18. The fine filtering apparatus of claim 1 (claim 13) *wherein the flexible fibers are composed of a single material or different materials according to the supplied water to be filtered or a degree of treatment of the supplied water.*

All flexible fibers of claim 13 are either "single materials or different materials." Therefore, claim 18 does not further limit claim 13.

Claim 19. The fine filtering apparatus of claim 1 (claim 13) *wherein the quality of the clarified water is controlled according to the packing density of the flexible fibers, filtration flux, and surface toughness and thickness of the flexible fiber.*

Claim 20. The fine filtering apparatus of claim 1 (claim 13) *wherein the supplied water and backwash air are supplied to the supply pipeline and filtering and backwashing are performed in the same direction.*

Claim 21. The fine filtering apparatus of claim 1 (claim 13) *wherein an extra water tank, pump, valve, and piping for backwash are not required by using the supplied water as backwash water during backwashing.*

Claim 13 is an apparatus claim. Claims 19 through 21 depend on claim 13 -- and do not further limit the apparatus recited in claim 13.

Claim 22. The fine filtering apparatus of claim 9 (claim 21), *wherein filtering and backwashing are performed in the same direction by using the supplied water as the backwash water so during backwashing.*

Claim 13 is an apparatus claim, upon which claim 21 depends. As stated above, claim 21 does not further limit the apparatus claim 13. Similarly, claim 22 does not further limit the apparatus claim 13.

Claim 23. The fine filtering apparatus of claim 4 (claim 16), *wherein during backwashing, backwash air intermittently supplied through the backwash air supply holes of the filter media fixing plate or the backwash air discharge holes of the backwash air supply pipeline produces turbulence thereby generating shearing stress in the flexible fiber filter media and allowing contaminants entrapped by the filter media to separate from the filter media in a short period.*

Claim 16 is an apparatus claim. Claim 23 does not further limit the apparatus claim 16.

Claim 24. The fine filtering apparatus of claim 11 (claim 23), *wherein the backwash air is generated by an air compressor, stored under high pressure in a storage tank connected to the backwash air supply pipeline, and then periodically supplied to the main body during backwashing.*

Claim 16 is an apparatus claim, upon which claim 23 depends. As stated above, claim 23 does not further limit the apparatus claim 16. Similarly, claim 24 does not further limit the apparatus claim 16.

Specification

3. The disclosure is objected to because of the following informality: In the second sentence of the abstract, delete the final two words " is provided." Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 13 and 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zha et al. (US Patent No. 6,524,481 B2, Feb. 25, 2003) and further in view of Ford et al. (U.S. Patent No. 4,816,160, Mar. 28, 1989). Claim 13 is rejected over the prior art. Claims 18-21 are rejected because they depend on claim 13 but do not further limit the apparatus structure recited in claim 13. Similarly, Claim 22 is rejected because it depends on claim 21 but does not further limit the apparatus structure recited in claim 21.

With regards to claim 13, Zha et al. discloses a method and apparatus for cleaning a fine filter apparatus (membrane module) that includes positioning the flexible fiber filter media (plurality of porous membranes) to maintain high packing density and assist in cleaning. Zha et al., Abstract. Zha et al. does not teach the specific main body with a filtrate inlet at one end and a concentrated filtrate outlet at the other end; however Ford et al. does in Figure 1 where the inlet is at reference number 15 and the outlet is at reference number 17. The Ford et al. invention is "described in relation to the use of hollow fibres in the recovery of fine solids from suspensions." Ford et al., Column 1, lines 8-10. It would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange the Zha et al. fine filtering apparatus to accommodate the Ford et al. main body since Ford et al. shows in Figure 1 and states at Column 4, lines 26-35 that such a modification would allow the waste water (feed) being pumped into the main body (shell) to travel the length of the flexible fibers (hollow fibres) before exiting at the discharge jacket (outlet).

8. Zha et al. also locates the inner chamber at the bottom of the apparatus while applicant locates the inner chamber at the top. In either case, the inner chamber is being located near the outlet to clean the flexible fibers at the highest solids content. It would have been obvious to one having ordinary skill in the art at the time the invention was made to locate the inner chamber near the outlet, as was done by both applicant and Zha et al., since such a modification would more readily clean the flexible fibers at the point of highest solids content.

9. An element-by-element matching between claim 13 and the prior art is shown below. Claims 18-22 are then individually discussed. In summary, claim 13 limitations are an obvious variation over the prior art. Claims 18-21 depend on claim 13 but do not further limit the apparatus structure recited in claim 13. Claim 22 depends on claim 21 but does not further limit the apparatus structure recited in claim 21. Claims 13 and 18-22 are rejected over Zha et al., in view of Ford et al.

Claim 13. A fine filtering apparatus (Zha et al., Column 1, lines 18-25, 29-30) *comprising:*

a main body (Zha et al., Figure 1, reference number 5 is the membrane module and resides in the main body; Ford et al., Figure 1 where the inlet is at reference part 15 and the outlet is at reference part 17) *which is a main pathway of supplied water, the supplied water flowing in the longitudinal direction of the main body;*

filter media (Zha et al., Figure 1, reference number 6) *comprising flexible fibers enclosed by the main body and extending in the longitudinal direction of the main body, the flexible fibers controlling a packing density and filtering out a variety of suspended solids contained in the supplied water;*

a supplied water guide jacket (Zha et al., Figure 1, reference number 14 shows the "feed" coming in from the bottom; Figure 8, reference number 14 shows the "mixed liquor" coming in from the side) *supplying the supplied water to the side of the lower portion of the main body;*

a filter media fixing plate (Zha et al., Figures 1-5, reference number 11; Figures 6-8, reference number 7; Ford et al., Figure 1, reference number 14) *installed at the lower end of the supplied water guide jacket and having a plurality of fixing holes fixing lower ends of the flexible fiber filter media;*

a density control plate (Zha et al., Figure 6, fiber density is controlled into the donut shape using the media fixing plate and a screen (reference number 9)) *having a doughnut shape, installed between the supplied water guide jacket and the filter media fixing plate and preventing the supplied water ~~is~~ from flowing to the filter media fixing plate by increasing filling density of the flexible fibers fixed to the filter media fixing plate in hollow portion of the density control plate;*

an inner porous chamber (Zha et al., Figure 2, reference part 18 which is a part of a "venturi tube, jet, nozzle, ejector, eductor, injector, or the like" as described in Column 6, lines 15-17) *extending from the top of the main body and having a constant radius, the inner porous chamber increasing a density of upper layer of the filter media, and having a plurality of treated water supply holes formed therein through which water treated by the filter media is discharged outside of the main body; and*

a concentrated filtrate discharge jacket (Zha et al., Figure 1, reference number 5 is the membrane module and resides in the main body and does not explicitly show the concentrated filtrate discharge jacket; Ford et al.,

Figure 1 where the inlet is at reference part 15 and the outlet is at reference part 17) *covering a portion of the top and surrounding part of the outside of the main body, and discharging concentrated filtrate entrapped by the filter media, after being backwashed, outside of the main body.*

Claim 18. The fine filtering apparatus of claim 1 (claim 13) *wherein the flexible fibers are composed of a single material or different materials according to the supplied water to be filtered or a degree of treatment of the supplied water.*

Zha et al., in view of Ford et al., disclose all claim 13 limitations. All flexible fibers of claim 13 are either "single materials or different materials." Therefore, claim 18 does not further limit claim 13.

Claim 19. The fine filtering apparatus of claim 1 (claim 13) *wherein the quality of the clarified water is controlled according to the packing density of the flexible fibers, filtration flux, and surface toughness and thickness of the flexible fiber.*

Claim 20. The fine filtering apparatus of claim 1 (claim 13) *wherein the supplied water and backwash air are supplied to the supply pipeline and filtering and backwashing are performed in the same direction.*

Claim 21. The fine filtering apparatus of claim 1 (claim 13) *wherein an extra water tank, pump, valve, and piping for backwash are not required by using the supplied water as backwash water during backwashing.*

Zha et al., in view of Ford et al., discloses all claim 13 limitations. Claims 19-21 claim the apparatus of claim 13 and then recite intended use limitations that do not affect the claim 13 apparatus structure. Since the claim 13 apparatus structure was rejected above as an obvious variation over prior art, claims 19-21 are similarly rejected.

Claim 22. The fine filtering apparatus of claim 9 (claim 21)*, wherein filtering and backwashing are performed in the same direction by using the supplied water as the backwash water so during backwashing.*

Zha et al., in view of Ford et al., disclose all claim 21 limitations. Claim 22 claims the apparatus of claim 21 and then recites intended use limitations that do not affect the claim 21 apparatus structure. Since the claim 21 apparatus structure was rejected above as an obvious variation over prior art, claim 22 is also rejected.

10. Claims 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zha et al. (US Patent No. 6,524,481 B2, Feb. 25, 2003) and further in view of Ford et al. (U.S. Patent No. 4,816,160, Mar. 28, 1989). The claims are shown below in italics with the prior art and examiner's comments in normal font.

Claim 14. The fine filtering apparatus of claim 1 (claim 13)*, wherein lower ends of the flexible fibers are fixed to the filter media fixing plate and upper ends of the flexible fibers are not fixed; a plurality of supplied water passing holes* (Zha et al.,

Figures 1, reference number 10, Figures 3b, 4b, and 5b) *are formed in an area of the main body corresponding to the supplied water guide jacket, and the concentrated filtrate discharge jacket* (Ford et al., Figure 1, reference number 17 shows the concentrated filtrate outlet that is part of the discharge jacket) *is cylindrical and has a jacket shape such that the concentrated filtrate is discharged outside of the filtering apparatus through a predetermined discharge pipeline.*

Zha et al., in view of Ford et al., discloses all claim 13 limitations. Ford et al. further teaches "hollow fibre bundle in loose 'candle' configuration" that was "somewhat restrained by taping the fibres loosely and enclosing them in an open sleeve" which "avoided tangling and fibre breakage." Ford et al., Column 1, line 61 through Column 2, line 11.

Claim 15. The fine filtering apparatus of claim 1 (claim 13)*, further comprising a lower attached structure supporting the filter media fixing plate from below and having a backwash air supply pipeline supplying backwash air during backwashing.*

Zha et al., in view of Ford et al., discloses all claim 13 limitations. In Figure 1, Zha et al. further teaches the lower support structure having a backwash air supply pipeline (reference number 13).

Claim 16. The fine filtering apparatus of claim 3 (claim 15), *wherein a plurality of backwash air supply holes, through which the backwash air passes, are formed in the filter media fixing plate in a hexagonal arrangement, or are formed in the upper portion of the backwash air supply pipeline within the main body.*

Zha et al., in view of Ford et al., discloses all claim 15 limitations. In Figures 1-2 and 7-8, reference part 13, Zha et al. discloses a backwash air supply pipeline within the main body. Zha et al. further teaches a plurality of air supply holes arranged in a square, as opposed to applicant's hexagon, in the filter media fixing plate within the main body. Zha et al., Figure 5B, reference part 24. It would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange the air supply holes in the form of a hexagon instead of a square since applicant has not disclosed that the air supply holes in a hexagonal arrangement solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with air supply holes in a square arrangement.

In summary, Zha et al., in view of Ford et al., discloses all claim 16 limitations.

Claim 17. The fine filtering apparatus of claim 1 (claim 13), *wherein a volume of the inner porous to chamber is 10 to 50% of the volume of the main body.*

Zha et al., in view of Ford et al., discloses all claim 13 limitations. Zha et al. further teaches a packing density of "5 to about 70% and, more preferably, between 8 to about 55%." Zha et al., Column 4, lines 27-29.

Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zha et al. (US Patent No. 6,524,481 B2, Feb. 25, 2003) and further in view of Ford et al. (U.S. Patent No. 4,816,160, Mar. 28, 1989). The claims are shown below in italics with the prior art and examiner's comments in normal font.

Claim 23. The fine filtering apparatus of claim 4 (claim 16)*, wherein during backwashing, backwash air intermittently supplied through the backwash air supply holes of the filter media fixing plate or the backwash air discharge holes of the backwash air supply pipeline produces turbulence thereby generating shearing stress in the flexible fiber filter media and allowing contaminants entrapped by the filter media to separate from the filter media in a short period.*

Zha et al., in view of Ford et al., discloses all claim 16 limitations. Claim 23 claims the apparatus of claim 16 and then recites intended use limitations that do not affect the claim 16 apparatus structure. Since the claim 16 apparatus structure was rejected above as an obvious variation over prior art, claim 23 is similarly rejected.

Claim 24. The fine filtering apparatus of claim 11 (claim 23)*, wherein the backwash air is generated by an air compressor, stored under high pressure in a storage tank connected to the backwash air supply pipeline, and then periodically supplied to the main body during backwashing.*

Zha et al., in view of Ford et al., disclose all claim 23 limitations. Claim 24 claims the apparatus of claim 23 and then recites intended use limitations that do

not affect the claim 23 apparatus structure. Since the claim 23 apparatus structure was rejected above as an obvious variation over prior art, claim 24 is also rejected.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. These show a similar apparatus to applicant's in the art of cleaning membrane filters or brush filters.

Patent or PG Pub	Date	Inventor	Classification
US 20030178366 A1	09/25/2003	Boye, Bo	210/636
US 6090275 A	07/18/2000	Cheng; Danny Kwei	210/90
US 5057215 A	11/01/5991	Hecking; Willi	210/137
US 4957625 A	09/18/1990	Katoh; Yoshihisa et al.	210/119
US 4921610 A	05/01/1990	Ford; Douglas L. et al.	210/636
US 4851136 A	07/25/1989	Fanqing; Liu et al.	210/798
US 4219420 A	10/82/6980	Muller; Hans	210/798

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Denise R. Anderson whose telephone number is (571) 272-1447. The examiner can normally be reached on Mon-Fri 7:30-5:00 (alt. Fridays off).

13. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter D. Griffin can be reached on (571)272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

14. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DRA

Walter D. Griffin

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